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09/206,216	12/05/1998	JEAN-PIERRE DATH	F-721	5195
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EXAMINER
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NGUYEN, TAM M

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 05/06/2002

20

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/206,216

Applicant(s)

DATH ET AL.

Examiner

Tam M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,7-10,12-14,16-20,24 and 27-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-10,12-14,16-20,24 and 27-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Response to Amendment*

The rejection of claim 20 under 35 USC § 112 is withdrawn by the examiner in view of the amendment filed on February 13, 2002.

The objection to claims 28 and 31 is withdrawn by the examiner in view of the amendment filed on February 13, 2002.

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 9, 10, 12-14, 24, and 27-36 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of copending Application No. 09/206,208. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the feedstock comprises C4 to C10 hydrocarbons. Therefore, it would have been obvious to one having ordinary skill in the art at the time the

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invention was made to have modified the present claimed process by using a feedstock comprising C4 to C10 hydrocarbons because the present claimed process claims that a feedstock comprises at least one olefin can be used in the process.

Claims 1, 2, 9, 10, 12-14, 16, 17, 20, 24, and 27-36 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,207. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is an MFI crystalline silicate catalyst or ZSM-5 and does not disclose that the feed contains at least one sulfur, nitrogen, and/or oxygen derivative impurity. However, the crystalline catalyst of the present claimed process has the same characteristics as the MFI which is ZSM-5 of the process of claims 1-16. Therefore, the present claimed catalyst is ZSM-5 and it would be expected that the results would be the same when using the feed of claims 1-16 for the present claimed process because both claimed processes use the same catalyst and operate under the same conditions.

Claims 1, 2, 9, 10, 12-14, 24, and 27-36 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,218. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is prepared as claimed in claims 1-16 of application 09/206,218. However, it would have been obvious to one having ordinary skill in the

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art at the time the invention was made to have modified the claimed catalyst of the present application as claimed in the process of claims 1-16 of application 09/206,218 because the claimed catalyst of the present application is the same as the claimed catalyst of application 09/206,218. Therefore, it would be expected that the outcome of the present claimed process would be similar when preparing the claimed catalyst of the present application as claimed in the process of claims 1-16 of application 09/206,218.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 U.S.C. § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1, 2, 9, 12-14, 16, and 28-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Carpeny et al. (6,090,271).

Carpeny discloses a process of cracking a hydrocarbon feed of light cat naphtha or butenes to produce light olefins such as propylene by contacting the feed with a ZSM-5 catalyst which has a silica to alumina ratio of 2:1 to 2000:1. This is equivalent to silicon/aluminum atomic ratios of 1:1 to 1000:1. The feedstock flows at a space velocity in the range of about 0.1 hr<sup>-1</sup> to 100 hr<sup>-1</sup>. The process is operated at a temperature from 500 to 750° C and at about

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atmospheric pressure. It is estimated that at least 50% of propylene is present in the product stream. It is also estimated that at least 95% of the C<sub>2</sub> and C<sub>3</sub> compounds present in the effluent are present as C<sub>2</sub> and C<sub>3</sub> olefins. It is noted that the Carpency does not disclose that the feedstock has a maximum diene concentration therein of 0.1 wt.%. However, examples of Carpency show that the process can be operated without dienes in the feedstock. (See entire patent)

Claims 1, 2, 9, 10, 12, and 28-32 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0109060.

The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure. The process is conducted at a temperature of from 400<sup>0</sup> C to 600<sup>0</sup> C, at about atmospheric pressure, and at a space velocity of from 5 to 200 h<sup>-1</sup>. The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than 50 hr<sup>-1</sup>. If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above 50 hr<sup>-1</sup>. The examples indicate selectivity of C<sub>4</sub> saturated compounds of less than 5 wt. %. Therefore, at least 95% of the C<sub>2</sub> and C<sub>3</sub> compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within ± 15 % of each other. Alternatively, it is inherent that the EP reference would have olefins of the feedstock and of the effluent are within plus and minus 15 of each other because of the similarities by the EP process and the claimed process in terms of feedstock, catalyst, and operating conditions. It is noted that the reference does not specifically

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disclose a ratio of silicon/aluminum between 180 and 1000 or between 350 and 500. However, the reference discloses that the catalyst has a  $\text{SiO}_2/\text{Al}_2\text{O}_3$  molar ratio equal to or greater than 350. This is equivalent to silicon/aluminum atomic ratios of equal to or greater than 175. Therefore, the examiner's position is that the claimed ratio of silicon/aluminum is embraced by the reference. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

***Claim Rejections - 35 U.S.C. § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 7-10, 12-14, and 27-36 are rejected under 35 U.S.C. 103(a) as obvious over EP 0109060.

The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure and having a  $\text{SiO}_2/\text{Al}_2\text{O}_3$  molar ratio equal to or greater than 350. This is equivalent to silicon/aluminum atomic ratios of equal to or greater than 175. The process is conducted at a temperature of from  $400^\circ\text{C}$  to  $600^\circ\text{C}$ , at a substantially atmospheric pressure, and at a space velocity of from 5 to  $200\text{ h}^{-1}$ . The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than  $50\text{ hr}^{-1}$ . If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above  $50\text{ hr}^{-1}$ . The examples indicate selectivity of  $\text{C}_4$  saturated compounds of less than 5 wt %. Therefore, at least 95% of the  $\text{C}_2$  and  $\text{C}_3$  compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within  $\pm 15\%$  of each other. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

Regarding claims 1, 27-32, and 34-36, the EP reference does not specifically disclose that the atomic ratio of silicon to aluminum is from 180-1000 or 300-500. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have



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modified the EP catalyst by using a catalyst having an atomic ratio of silicon to aluminum of 180 or between 300-500 because the EP reference discloses that a catalyst having an atomic ratio of silicon to aluminum greater than 175 can be used in the process.

Regarding claims 27 and 34-36, the reference does not disclose that the feedstock comprises light cracked naphtha or is selected from a C<sub>4</sub> or C<sub>5</sub> cut from a steam cracker. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by having the feedstock from a source as claimed because the claimed feeds are chemically and physically similar to the feeds disclosed in EP 0109060 and therefore would be expected to behave similarly in the process of EP 019060 as the disclosed feeds.

Regarding claims 13 and 14, the reference does not specifically disclose the olefin partial pressures. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by utilizing the claimed olefin partial pressure because the EP 0109060 reference discloses pressures that overlap those claimed and discloses that the pressure is a result effective variable.

Regarding claim 33, the reference does not specifically disclose that the catalyst is a monoclinic silicalite. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst of EP 0109060 by using a catalyst having monoclinic crystalline structure because it would be expected that the outcome would be the same or similar when using a catalyst having monoclinic crystalline structure because catalyst of EP 0109060 is selected from a group of crystalline molecular sieves and silica-containing crystalline material.

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Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0109060 as applied to claim 1 above, and further in view of Cosyns et al. (5,306,852).

The EP 0109060 reference does not specifically disclose that the feed contains dienes, and does not disclose the step of hydrogenation of dienes.

Cosyns discloses a hydrogenation process in which a diolefin (or diene) containing hydrocarbon fraction produced by steam cracking or other cracking processes is hydrogenated. The dienes are converted into mono-olefins by contacting with a hydrogenation catalyst. (See abstract)

Regarding claims 16, 17 and 20, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by including a selective hydrogenation as disclosed by Cosyns because the EP process does not require the presence of dienes and one of ordinary skill in the art would look to the prior processes such as that disclosed by Cosyns to remove dienes if such compounds are not desired.

Regarding claims 18-20, Cosyns does not specifically disclose the LHSV of the feedstock and the hydrogenation operating conditions. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Cosyns process by utilizing the LHSV and the operating conditions as claimed because Cosyns utilizes a hydrogenation catalyst to convert dienes in a hydrocarbon stream, which is from the same sources as claimed, to mono-olefins. Therefore, it would be expected that the results would be similar or the same when operating the Cosyns process under the claimed conditions.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 as applied to claim 1, and further in view of Gajda et al. (5,522,984).

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The EP 010960 reference does not specifically disclose the step of pretreating the catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Gajda discloses a de-aluminating process of a cracking catalyst by steaming the catalyst and then contacting the steamed catalyst with an aqueous solution. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by pre-treating the catalyst as taught by Gajda because the Gajda catalyst pretreating step will produce a catalyst having a desirable silicon/aluminum ratio. (See Gajda, col. 3, lines 13-49; col. 4, lines 43-49)

Alternatively, claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 as applied to claim 1 above, and further in view of Kuehl et al. (4,954,243).

The EP 010960 reference does not specifically disclose the step of pretreating catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Kuehl discloses the dealumination of zeolites which are used in catalytic cracking to result in zeolites that can have silica: alumina mole ratios of 300 or greater. The dealumination can occur by calcination in the presence of water followed by treatment with a complexing agent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by dealuminating the zeolite to achieve the desired silicon:aluminum atomic ratio as suggested by Kuehl because the zeolite will exhibit very low coke make thereby allowing very long times on stream between regenerations. (See Kuehl, col. 3, lines 44-65; col. 4, lines 15-28; col. 8, lines 65-68; col. 9, lines 11-17 and 55-68; col. 10, lines 1-5; col. 11, lines 27-68; col. 12, lines 1-7 and 48-58)

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Claims 1, 7-10, and 27-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carpency et al. (6,090,271).

Regarding claims 1, 27-32 and 34-36, Carpency does not specially disclose that the ratio of silicon to aluminum ranges from 180-1000 or from 300-500. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Carpency process by using a catalyst having an atomic ratio of silicon to aluminum between 180-1000 or between 300-500 because Carpency discloses that a catalyst having an atomic ratio of silicon to aluminum between 1-1000 can be used in the process.

Regarding claims 27 and 34, Carpency does not disclose specifically that the feedstock comprises olefins and light cat naphtha. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Carpency process by utilizing a feed that comprises olefins such as butenes and light cat naphtha because Carpency teaches that the feedstock is selected from either butenes or light cat naphtha. Therefore, it would be expected that the results would be the same or similar when using a feedstock that comprises both butenes and light cat naphtha.

Regarding claim 33, Carpency does not specifically disclose that the catalyst is a monoclinic silicalite. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst of Carpency by using a catalyst having monoclinic crystalline structure because it would be expected that the outcome would be the same or similar when using a catalyst having monoclinic crystalline structure because the catalyst of Carpency is selected from a group of crystalline molecular sieves and silica-containing crystalline material.

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Regarding claims 35 and 36, the reference does not disclose that the feedstock comprises light cracked naphtha or is selected from a C<sub>4</sub> cut from a steam cracker or an FCC unit.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Carpeny process by using a C<sub>4</sub> cut from a steam cracker because the claimed feeds are chemically and physically similar to the feeds disclosed in the reference and therefore would be expected to behave similarly in the process of Carpeny as the disclosed feeds.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carpeny et al. (6,090,271) as applied to claim 1, and further in view of Gajda et al. (5,522,984).

The Carpeny reference does not specifically disclose the step of pretreating the catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Gajda discloses a de-aluminating process of a cracking catalyst by steaming the catalyst and then contacting the steamed catalyst with an aqueous solution. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Carpeny process by pre-treating the catalyst as taught by Gajda because the Gajda catalyst pretreating step will produce a catalyst having a desirable silicon/aluminum ratio. (See Gajda, col. 3, lines 13-49; col. 4, lines 43-49)

### ***Response to Arguments***

The argument that Carpeny fails to disclose the combination of silicon/aluminum ratio of 180-1000, temperature of 500-600<sup>0</sup> C, and space velocity of 10-30 hr<sup>-1</sup> as in the claimed process is noted. However, the argument is not persuasive because the silicon/aluminum ratio,

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temperature, and space velocity of Carpency overlap the claimed ratio, temperature, and space velocity. Also, the examiner maintains that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of by utilizing the claimed ratio, temperature, and space velocity because one having ordinary skill in the art would operate the Carpency process at any silicon/aluminum ratio, temperature, and space velocity including the overlapping ratios, temperatures, and space velocities.

The argument that Carpency fails to disclose the use of a ZSM-5 zeolite having a silicon/aluminum atomic ratio of 1:1 to 1000:1 is noted. However, the argument is not persuasive because Carpency clearly teaches a zeolite catalyst such as ZSM-5 which has a silica/alumina ratio within the range of about 2.0:1 to 2000:1. This is equivalent to silicon/aluminum atomic ratios of 1:1 to 1000:1. (See col. 3, line 64 through col. 4, line 5; claims 18 and 23).

The argument that Carpency fails to disclose an olefin partial pressure as set forth in claims 13 and 14 is noted. However, the argument is not persuasive because the total pressure is about atmospheric and the feed can be 100% olefin. Therefore, partial pressure of olefins can be less than or equal to the total pressure (1 atm) and the olefin partial pressure can be also within the claimed range.

The argument that Carpency does not disclose a maximum diene concentration in the feedstock of 0.1% is noted. However, the argument is not persuasive because the Carpency process can be operated without adding diene in the feed. (See table 1. col. 6, lines 25-29)

The argument that Carpency does not disclose the use of two hydrocarbon streams is noted. However, the argument is not persuasive because Carpency discloses that the feedstock is

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a stream selected from a group of steam cracked naphtha, butylenes, pentylenes, coker naphtha, light cat naphtha, and light virgin naphtha. Carpency also discloses that the feed can be blended from those streams. Therefore, it would have been obvious to one having ordinary skill in the art to utilize two streams such as butylene and light cat naphtha in the process of Carpency. (See col. 3, lines 35-46; claims 7 and 25)

The argument that Carpency does not teach that the catalyst is monoclinic silicalite is noted. However, the argument is not persuasive because the examiner maintains that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst of Carpency by using a catalyst having monoclinic crystalline structure because it would be expected that the outcome would be the same or similar when using a catalyst having monoclinic crystalline structure because the catalyst of Carpency is selected from a group of crystalline molecular sieves and silica-containing crystalline material which is similar to the claimed zeolite.

The argument that EP'060 does not disclose the claimed ratio of silicon/aluminum of from 180-1000 or 350-500 is noted. However, the argument is not persuasive because the EP 019060 reference discloses a silica/alumina mole ratio in the zeolite of equal to or greater than 350. This is equivalent to silicon/aluminum atomic ratios of equal to or greater than 175 and would necessarily include values within the range of 300 to 500 as claimed.

The argument that EP '060 fails to disclose the combination of silicon/aluminum ratio of 180-1000, temperature of 500-600<sup>0</sup> C, and space velocity of 10-30 hr<sup>-1</sup> as in the claimed process is noted. However, the argument is not persuasive because the silicon/aluminum ratio, temperature, and space velocity of EP'060 overlap the claimed ratio, temperature, and space

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velocity. Also, the examiner maintains that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of EP '060 by utilizing the claimed ratio, temperature, and space velocity because one having ordinary skill in the art would operate the EP '060 process at any silicon/aluminum ratio, temperature, and space velocity including the overlapping ratios, temperatures, and space velocities.

The argument that the EP '060 reference does not disclose or suggest a process for cracking olefins in which the olefin content of the feedstock and the effluent are substantially the same by weight or within  $\pm 15\%$  of each other is noted. However, the argument is not persuasive because in page 4, example 25 of the reference, the examiner calculates that for every 100 grams of isobutene reactant, 77.3% by weight are converted thereby producing a product that contains 22.7 grams of isobutene and 77.3 grams of other compounds. The combined selectivity of C2 and C3 of 43.4% results in product containing 33.5 grams of C2 + C3 ( $77.3 \times 0.434$ ). With a selectivity to saturated compounds less than C4 of 6.6%, the amount of C2 + C3 olefins is estimated to be 31.3 grams ( $33.5 \text{ grams} \times 0.934$ ). Also, a selectivity to linear butenes of 44% results in the production of 34.0 grams ( $77.3 \text{ grams} \times 0.44$ ) of linear butenes. Adding the amount of isobutene, C2 olefins + C3 olefins, and linear butenes results in the product containing approximately 88 grams of C2 to C4 olefins. This amount results in a product that has an olefin content within  $\pm 15\%$  of the olefin content of the feed and therefore discloses a product that has an olefin content substantially the same by weight as the olefin content of the feedstock.

The argument that the product of the EP '060 reference does not disclose that at least 90 or 95% of C2 to C3 compounds present in the effluent are present as C2 to C3 olefins. However,



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the argument is not persuasive because according to the tables, the only C2 to C3 compounds in the product are olefins. Therefore, the limitations are embraced by the reference.

The argument that there is no motivation to combine the EP '060 reference and the Cosyns reference because of the difference between the EP '060 feed and the Cosyns feed is noted. However, the argument is not persuasive because the EP' 060 process does not require the presence of dienes and Cosyns discloses a process for hydrogenation of dienes from a hydrocarbon feed comprising mono-olefin. Therefore, one of ordinary skill in the art would look to the hydrogenation zone of Cosyns to remove dienes if such compounds are not desired.

The argument that Gajda does not disclose the claimed ratio of silicon/aluminum is noted. However, the argument is not persuasive because the examiner modified the EP process by employing any dealuminating method including the de-aluminating method of Gajda, which is similar to the claimed method, to increase the silicon/aluminum ratio meet the requirement of the EP process, not to meet the requirement of Gajda.

The argument that, in the process of dealuminating, Gajda does not disclose a step of a complexing agent forming a coordination complex with the aluminum to remove aluminum from the molecular sieve framework is noted. However, the argument is not persuasive, because Gajda discloses that the catalyst is heated in steam and then treated with a complexing agent as claimed in claim 24.

The argument that the catalytic treating step of Kuehl is different from the claimed treating step is noted. However, the argument is not persuasive because Kuehl discloses that the catalyst is dealuminated by heating with steam and then treating with a complexing agent as claimed. (See col. 11, lines 52-65)

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*Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715. The examiner can normally be reached on Monday through Thursday.

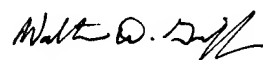
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703 308 4311. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tam M. Nguyen  
Examiner  
Art Unit 1764

Tam Nguyen/ TN  
May 3, 2002

  
**Walter D. Griffin**  
**Primary Examiner**